Still River

Watershed Summary

Watershed Description and Maps

The Still River watershed covers an area of approximately 10,315 acres in the northwestern corner of Connecticut (Figure 1). There are four municipalities located in the watershed, including Winchester, Colebrook, Torrington, and Barkhamsted, CT.

The Still River watershed includes three segments impaired for recreation due to elevated bacteria levels. These segments were assessed by Connecticut Department of Energy and Environmental Protection (CT DEEP) and included in the CT 2010 303(d) list of impaired waterbodies. Some segments in the watershed are currently unassessed as of the writing of this document. This does not suggest that there are no issues on these segments, but indicates a lack of current data to evaluate the segments as part of the assessment process. An excerpt of the Integrated Water Quality Report is included in Table 1 (CTDEEP, 2010).

The Still River (Segment 4) (CT4303-00_04) begins at the outlet of Goodwin Pond in Paugnut State Forest in Torrington, flows northerly parallel to Route 8, crosses into Winchester, and ends at the confluence with the Mad River. The Still River (Segment 3) (CT4303-00_03) continues northerly through the City of Winsted, and ends at the Winchester (Winsted) wastewater treatment plant. The Still River (Segment 2) (CT4303-00_02) begins downstream of the treatment plant, continues north parallel to Route 8 into Colebrook, and ends at the confluence with Sandy Brook (previously known as Still River (Segment 1) (CT4303-00_01)) near Robertsville Road (Figures 2 and 5).

Segments 2 and 3 of the Still River have a water quality classification of B. Designated uses include habitat for fish and other aquatic life and wildlife, recreation, and industrial and agricultural water supply. The Still River (Segment 4) has a water quality classification of A. Designated uses include potential drinking water supplies, habitat for fish and other aquatic life and wildlife, recreation, and industrial and agricultural water supply. These segments are impaired due to elevated bacteria concentrations, affecting the designated use of recreation. As there are no designated beaches in these

Impaired Segment Facts

Impaired Segments:
1. Still River (Segment 2) (CT4303-00_02)
2. Still River (Segment 3) (CT4303-00_03)
3. Still River (Segment 4) (CT4303-00_04)

Municipalities: Winchester, Colebrook, and Torrington

Impaired Segments and Lengths (miles): 4303-00_02 (2.67), 4303-00_03 (1.67), 4303-00_04 (7.56)

Water Quality Classifications:
Class A (4303-00_02 and 03)
Class B (4303-00_04)

Designated Use Impairments: Recreation

Sub-regional Basin Name and Code: Still River, 4303

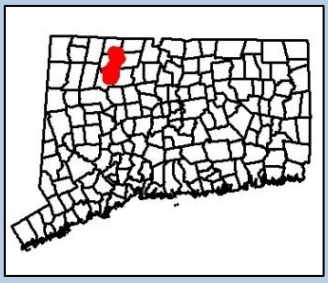
Regional Basin: Farmington

Major Basin: Connecticut

Watershed Area (acres): 10,315

MS4 Applicable? No

Figure 1: Watershed location in Connecticut



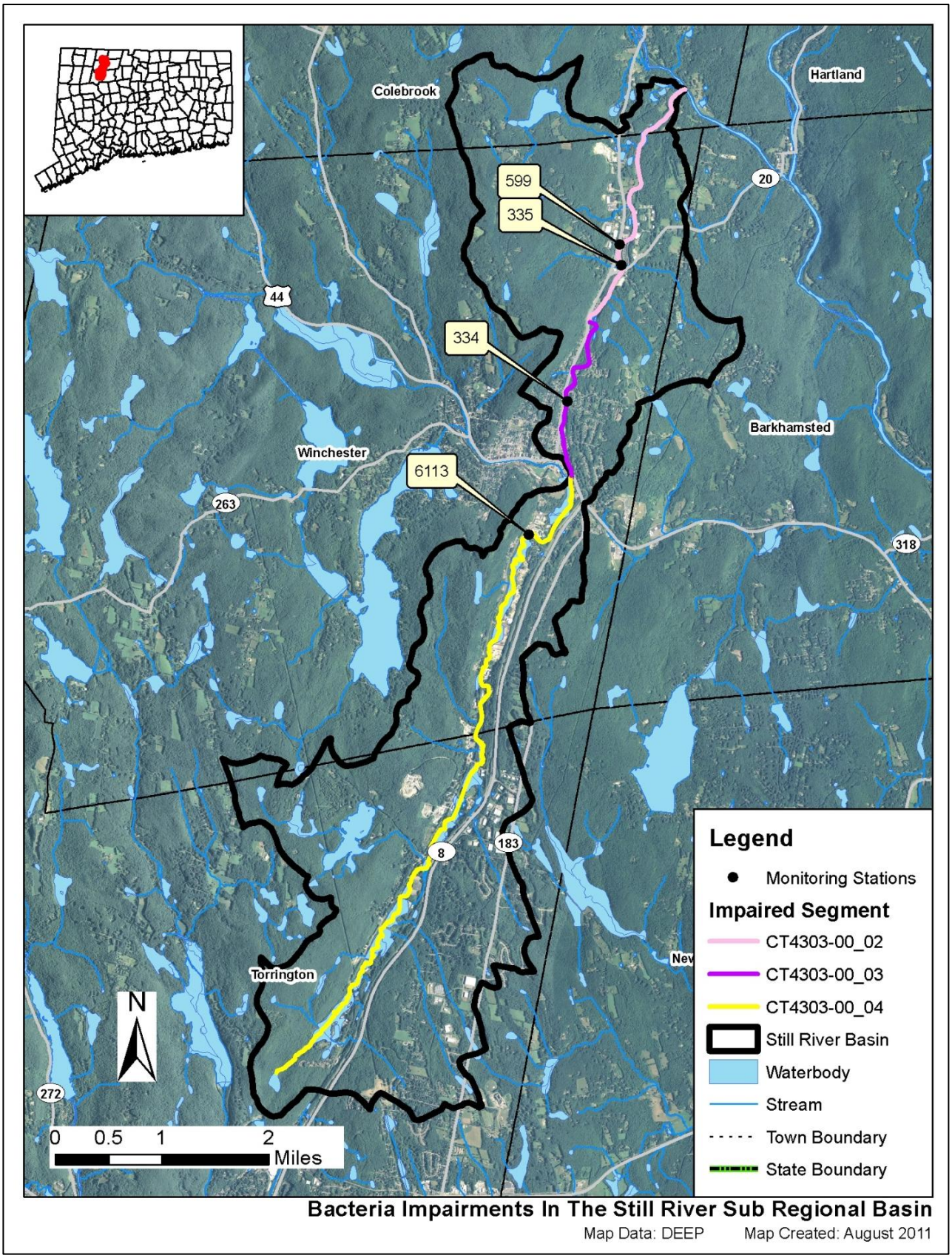
segments of the Still River, the specific recreation impairment is for non-designated swimming and other water contact related activities.

Table 1: Impaired segments and nearby waterbodies from the Connecticut 2010 Integrated Water Quality Report (IWQR)

Waterbody ID	Waterbody Name	Location	Miles	Aquatic Life	Recreation	Fish Consumption
CT4303-00_02	Still River (Colebrook)-02	From confluence with Sandy Brook, Colebrook, US to Winchester (Winsted) POTW (east side of Route 8), Winsted.	2.67	NOT	NOT	FULL
CT4303-00_03	Still River (Winsted)-03	From Winchester (Winsted) POTW, US to confluence with Mad River (just US of Route 44/183 crossing).	1.67	NOT	NOT	FULL
CT4303-00_04	Still River (Winsted/ Torrington)-04	From confluence with Mad River (just US of Route 44/183 crossing), US to headwaters (on west side of Route 8, parallel with Exit 45 off-ramp), Torrington.	7.56	U	FULL*	FULL

Shaded cells indicate impaired segment addressed in this TMDL
FULL = Designated Use Fully Supported
NOT = Designated Use Not Supported
U = Unassessed
*** = Recreation impairment based on recent data included in 2012 IWQR**

Figure 2: GIS map featuring general information of the Still River watershed at the sub-regional level (the location and name of each sampling station is indicated on each segment)



Land Use

Existing land use can affect the water quality of waterbodies within a watershed (USEPA, 2011c). Natural processes, such as soil infiltration of stormwater and plant uptake of water and nutrients, can occur in undeveloped portions of the watershed. As impervious surfaces (such as rooftops, roads, and sidewalks) increase within the watershed landscape from commercial, residential, and industrial development, the amount of stormwater runoff to waterbodies also increases. These waterbodies are negatively affected as increased pollutants from nutrients and bacteria from failing and insufficient septic systems, oil and grease from automobiles, and sediment from construction activities become entrained in this runoff. Agricultural land use activities, such as fertilizer application and manure from livestock, can also increase pollutants in nearby waterbodies (USEPA, 2011c).

As shown in Figures 3 and 4, the Still River watershed consists of 64% forest, 27% urban, 5% water, and 4% agriculture. The majority of the watershed is forested, particularly in the southern and western portions of the watershed around the Paugnut State Forest in Torrington. Urban areas are located along Route 8 and are concentrated around the City of Winsted. Agricultural operations are clustered near the southeastern and northeastern corners of the watershed (Figure 4).

Figure 3: Land use within the Still River watershed

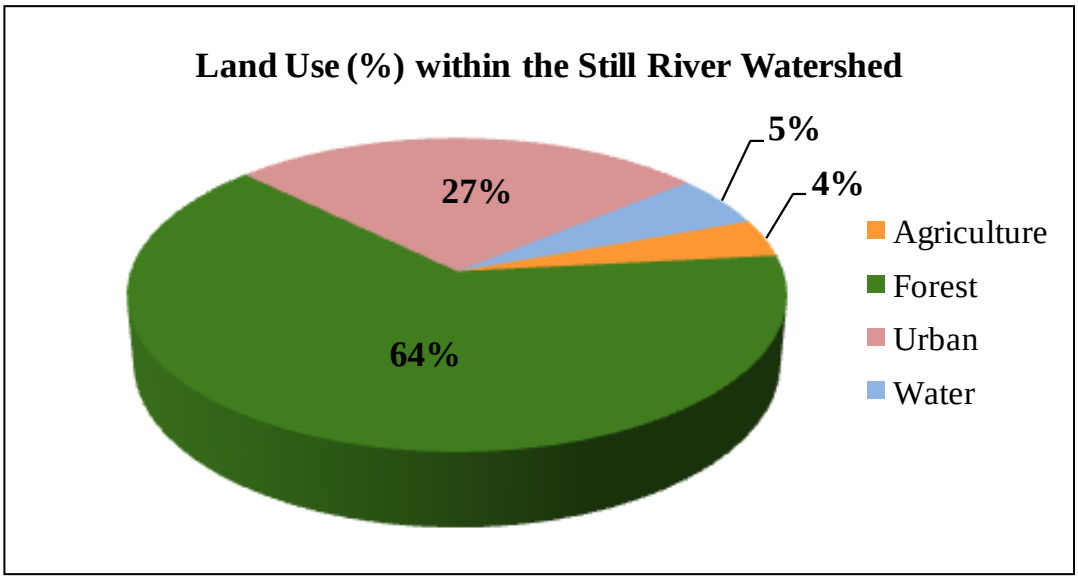
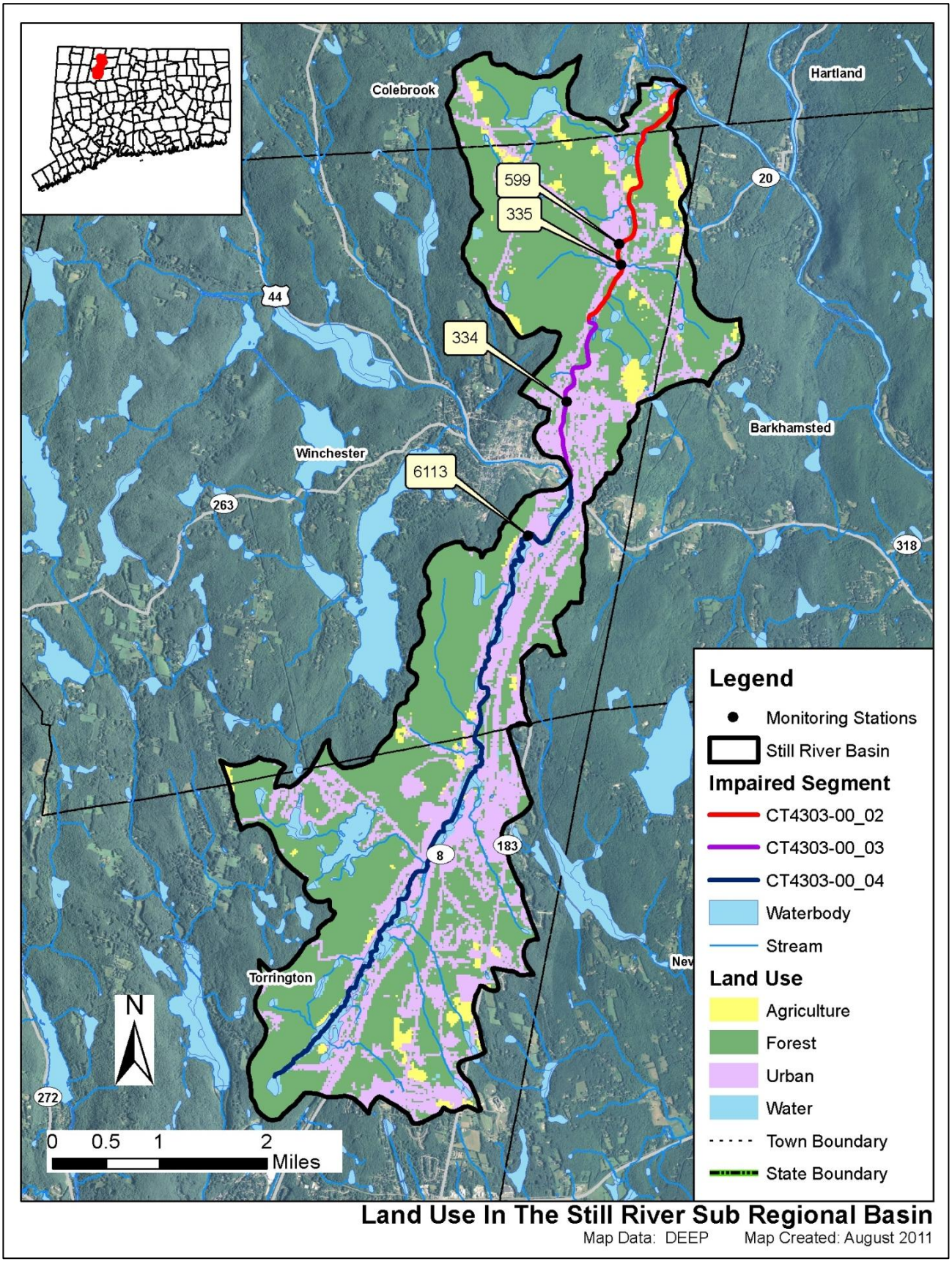


Figure 4: GIS map featuring land use for the Still River watershed at the sub-regional level



WHY IS A TMDL NEEDED?

E. coli is the indicator bacteria used for comparison with the CT State criteria in the CT Water Quality Standards (WQS) (CTDEEP, 2011). All data results are from CT DEEP, USGS, Bureau of Aquaculture, or volunteer monitoring efforts at stations located on the impaired segments.

Table 2: Sampling station location descriptions for impaired segments in the Still River watershed (stations organized downstream to upstream)

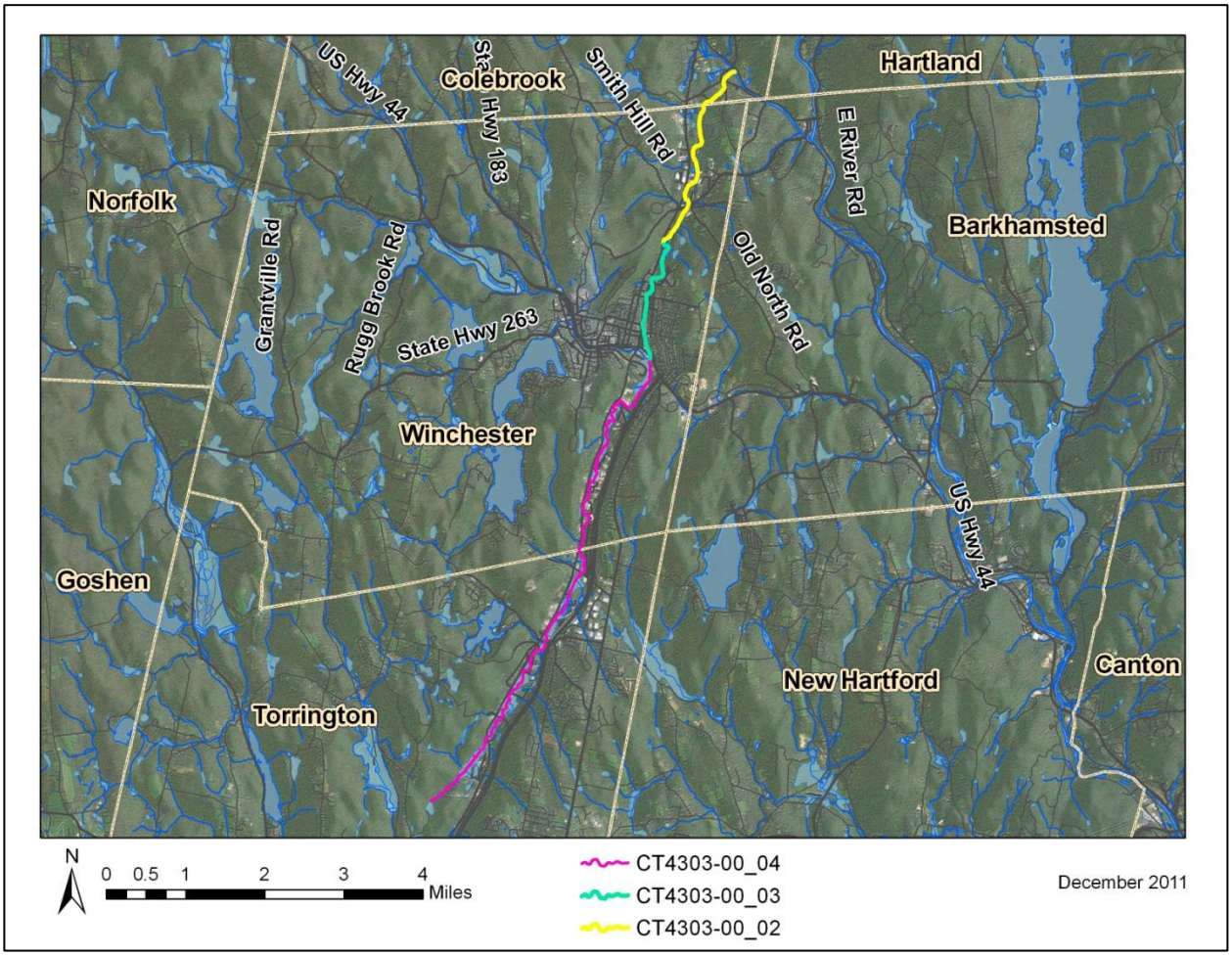
Waterbody ID	Waterbody Name	Station	Station Description	Municipality	Latitude	Longitude
CT4303-00_02	Still River	599	VFW lodge on Route 8 (site 39) upstream industrial building	Winchester	41.950308	-73.048992
CT4303-00_02	Still River	335	Route 8 behind VFW	Winchester	41.947572	-73.048711
CT4303-00_03	Still River	334	Wallens Street	Winchester	41.928983	-73.058439
CT4303-00_04	Still River	6113	New Street	Winchester	41.910890	-73.065310

Two of the three impaired segments on the Still River (CT4303-00_02 and CT4303-00_03) are Class B freshwater rivers (Figure 5). Their applicable designated uses are habitat for fish and other aquatic life and wildlife, recreation, and industrial and agricultural water supply. The Still River (CT4303-00_04) is a Class A freshwater river (Figure 5). Its applicable designated uses are potential drinking water supply, habitat for fish and other aquatic life and wildlife, recreation, and industrial and agricultural water supply. Water quality analyses were conducted using data from two sampling locations on the Still River (Segment 2) (Stations 335 and 559) from 1999-2000, one sampling location on the Still River (Segment 3) (Station 334) from 1998-2000, and one sampling location on the Still River (Segment 4) (Station 6113) in 2010 (Table 2).

The water quality criteria for *E. coli*, along with bacteria sampling results from all sample years, are presented in Tables 8-10. For the Still River (Segment 2), the annual geometric mean exceeded the WQS for *E. coli* at Station 335 in 1999. Single sample values for this station exceeded the WQS for *E. coli* in 1998. For the Still River (Segment 3), the annual geometric mean value exceeded the WQS for *E. coli* at Station 334 in 1999. Single sample values for this station exceeded the WQS for *E. coli* on two dates in 1999. For the Still River (Segment 4), the annual geometric mean value exceeded the WQS for *E. coli* at Station 6113 in 2010. Single sample values for this station exceeded the WQS on multiple dates in 2010, with one value exceeding 3,000 colonies/100 mL.

To aid in identifying possible bacteria sources, the geometric mean was also calculated for each station for wet-weather and dry-weather sampling days, where appropriate (Tables 8-10). For the Still River (Segment 2), all samples were taken in dry weather, and the geometric mean at Station 335 exceeded the WQS for *E. coli*. For the Still River (Segment 3), the geometric means during wet and dry-weather were calculated for Station 334 and only the geometric mean during wet-weather exceeded the WQS for *E. coli*. For the Still River (Segment 4), the geometric means during wet and dry-weather were calculated for Station 6113 and both exceeded the WQS for *E. coli*. At Station 6113, the geometric mean during we-weather was much higher than dry-weather.

Figure 5: Aerial map of the Still River



Due to the elevated bacteria measurements presented in Tables 8-10, these three impaired segments did not meet CT's bacteria WQS, were identified as impaired, and were placed on the CT List of Waterbodies Not Meeting Water Quality Standards, also known as the CT 303(d) Impaired Waters List. The Clean Water Act requires that all 303(d) listed waters undergo a TMDL assessment that describes the impairments and identifies the measures needed to restore water quality. The goal is for all waterbodies to comply with State WQS.

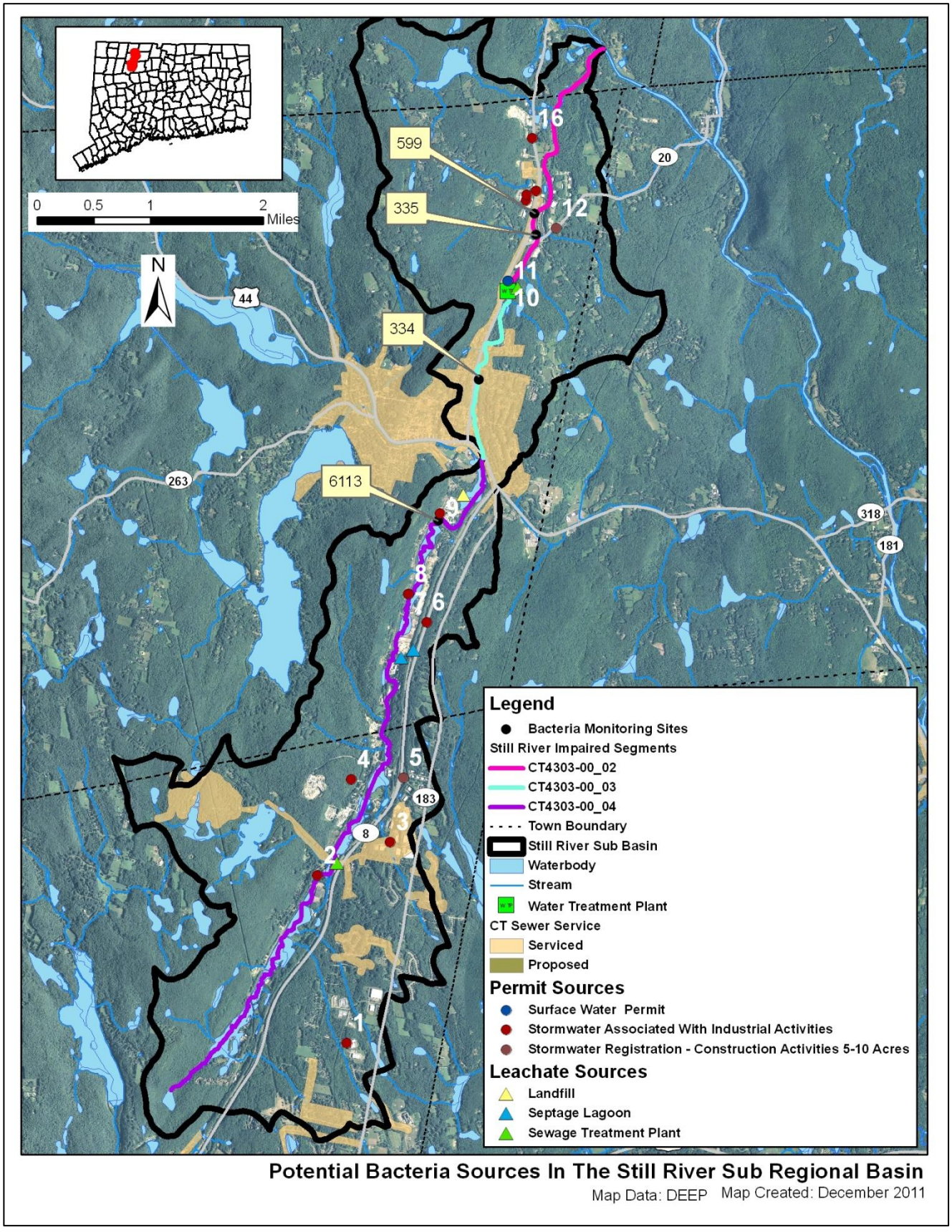
POTENTIAL BACTERIA SOURCES

Potential sources of indicator bacteria in a watershed include point and non-point sources, such as stormwater runoff, agriculture, sanitary sewer overflows (collection system failures), illicit discharges, and inappropriate discharges to the waterbody. Potential sources that have been tentatively identified in the watershed based on land use (Figures 3 and 4) and a collection of local information for the impaired waterbody is presented in Table 3 and Figure 6. However, the list of potential sources is general in nature and should not be considered comprehensive. There may be other sources not listed here that contribute to the observed water quality impairment in the study segments. Further monitoring and investigation will confirm listed sources and discover additional ones. Some segments in this watershed are currently listed as unassessed by CT DEEP procedures. This does not suggest that there are no potential issues on this segment, but indicates a lack of current data to evaluate the segment as part of the assessment process. For some segments, there are data from permitted sources, and CT DEEP recommends that any elevated concentrations found from those permitted sources be addressed through voluntary reduction measures. More detailed evaluation of potential sources is expected to become available as activities are conducted to implement these TMDLs.

Table 3: Potential bacteria sources in the Still River watershed

Impaired Segment	Permit Source	Illicit Discharge	CSO/SSO Issue	Failing Septic System	Agricultural Activity	Stormwater Runoff	Nuisance Wildlife/Pets	Other
Still River CT4303-00_02 (Segment 2)	x	x		x	x	x	x	x
Still River CT4303-00_03 (Segment 3)	x	x		x		x	x	x
Still River CT4303-00_04 (Segment 4)	x	x		x	x	x	x	x

Figure 6: Potential sources in the Still River watershed at the sub-regional level



The potential sources map for the impaired basin was developed after thorough analysis of available data sets. If information is not displayed in the map, then no sources were discovered during the analysis. The following is the list of potential sources that were evaluated: problems with migratory waterfowl, golf course locations, reservoirs, proposed and existing sewer service, cattle farms, poultry farms, permitted sources of bacteria loading (surface water discharge, MS4 permit, industrial stormwater, commercial stormwater, groundwater permits, and construction related stormwater), and leachate and discharge sources (agricultural waste, CSOs, failing septic systems, landfills, large septic tank leach fields, septage lagoons, sewage treatment plants, and water treatment or filter backwash).

Point Sources

Permitted sources within the watershed that could potentially contribute to the bacteria loading are identified in Table 4. This table includes permit types that may or may not be present in the impaired watershed. A list of active permits in the watershed is included in Table 5. Additional investigation and monitoring could reveal the presence of additional discharges in the watershed. Available effluent data from each of these permitted categories found within the watershed are compared to the CT State WQS for the appropriate receiving waterbody use and type. When available, bacteria data results from these permitted sources are listed in Tables 6 and 7.

Table 4: General categories list of other permitted discharges

Permit Code	Permit Description Type	Number in watershed
CT	Surface Water Discharges	1
GPL	Discharge of Swimming Pool Wastewater	0
GSC	Stormwater Discharge Associated with Commercial Activity	0
GSI	Stormwater Associated with Industrial Activity	2
GSM	Part B Municipal Stormwater MS4	0
GSN	Stormwater Registration – Construction	0
LF	Groundwater Permit (Landfill)	0
UI	Underground Injection	2

Permitted Sources

As shown in Table 5, there are multiple permitted discharges in the Still River watershed. Bacteria data from 2001 – 2002 for many of these industrial permitted facilities are included in Table 6. Though this data cannot be compared to a water quality standard as Connecticut does not have a recreation standard for fecal coliform bacteria, multiple samples were high from the Howmet Corporation (GSI000362) in Winchester (exceeding 11,000 colonies/100 mL), and the Winchester Public Works Garage (GSI001263) (exceeding 200,000 colonies/100 mL).

Since the MS4 permits are not targeted to a specific location, but the geographic area of the regulated municipality, there is no one accurate location on the map to display the location of these permits. One dot will be displayed at the geographic center of the municipality as a reference point. Sometimes this location falls outside of the targeted watershed and therefore the MS4 permit will not be displayed in the

Potential Sources Map. Using the municipal border as a guideline will show which areas of an affected watershed are covered by an MS4 permit.

Table 5: Permitted facilities within the Still River watershed

Town	Client	Permit ID	Permit Type	Site Name/Address	Map #
Torrington	Emsar Inc	GSI001220	Stormwater Associated With Industrial Activities	Emsar, Inc.	3
Torrington	Fuelcell Energy, Inc.	GSI001440	Stormwater Associated With Industrial Activities	Fuelcell Energy, Inc.	1
Torrington	O & G Industries, Inc.	GSI001692	Stormwater Associated With Industrial Activities	O & G Burrville Quarry	4
Torrington	Rbc Aircraft Products Inc	GSI002024	Stormwater Associated With Industrial Activities	Rbc Aircraft Products, Inc.	2
Torrington	City Of Torrington	GSN002097	Stormwater Registration - Construction Activities 5-10 Acres	Reconstruction Of Pinewoods Road	5
Winsted	Usa Hauling And Recycling, Inc.	GSI001982	Stormwater Associated With Industrial Activities	Torrington Road Transfer Center	6
Winsted	State Of Connecticut Department Of Transportation	GSI000085	Stormwater Associated With Industrial Activities	Winchester Maintenance & Repair Facility	7
Winsted	State Of Connecticut Department Of Transportation	GSI002318	Stormwater Associated With Industrial Activities	Winchester Maintenance & Repair Facility	8
Winsted	Town Of Winchester	GSI001263	Stormwater Associated With Industrial Activities	Winsted Public Works Garage	9
Winsted	Town Of Winchester	GSI001929	Stormwater Associated With Industrial Activities	Winsted WPCF	10
Winsted	City of Winsted	CT0101222	Industrial NPDES	Winsted WPCF	11
Winsted	City of Winsted	CT0101222	Industrial NPDES	Winsted WPCF	13
Winsted	Bnb Manufacturing Co., Inc.	GSI000783	Stormwater Associated With Industrial Activities	Bnb Manufacturing Company, Inc.	14
Winsted	The Homer D. Bronson Company, A Delware Corporation	GSI000827	Stormwater Associated With Industrial Activities	Homer D. Bronson Company, The	15
Winsted	Howmet Castings	GSI000362	Stormwater Associated With Industrial Activities	Howmet Castings	16
Winsted	Winsted Precision Ball Company	GSI000910	Stormwater Associated With Industrial Activities	Winsted Precision Ball Company	12
Winsted	Route 20 Associates, Llc	GSN001666	Stormwater Registration - Construction Activities 5-10 Acres	Route 20 Associates, Llc	3

Table 6: Industrial permits in the Still River watershed and available fecal coliform data (colonies/100 mL). The result cannot be compared to the water quality standard as there is no recreation standard for fecal coliform.

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Torrington	Emsar	GSI1220	Still River	001	07/23/02	>200
Torrington	Emsar	GSI1220	Still River	002	07/23/02	44
Torrington	Emsar	GSI1220	Still River	#2 SW corner	11/20/01	0
Winchester	Winchester Public Works Garage	GSI1263	Still River	1	09/14/01	200,000
Winchester	Winchester Public Works Garage	GSI1263	Still River	2	09/14/01	150,000
Winchester	Winchester Public Works Garage	GSI1263	Still River, Basin 4303	Outfall #1	08/29/02	260
Winchester	Winchester Public Works Garage	GSI1263	Still River, Basin 4303	Outfall #2	08/29/02	>600
Winchester	Laidlaw Transit	GSI1304	creek to Still River	outfall 1-E side of site	03/26/02	10
Winchester	Waste Management of CT	GSI1556	Still River	Still River	06/05/02	240
Winchester	Waste Management of CT	GSI1556	Still River	Still River	07/16/03	60
Winchester	Coats North America	GSI169	Still River	culvert behind facility	08/28/01	1
Winchester	Howmet Corp	GSI362	Still River	SD	09/14/01	10
Winchester	Howmet Corp	GSI362	unnamed trib to Still River	stormwater	06/12/02	11,000
Winchester	BNB Mfg	GSI783	Still River	A	09/20/01	600
Winchester	BNB Manufacturing Comp	GSI783	Still River	OF A	09/15/02	1,600
Winchester	Homer D Bronson Company	GSI827	Still River	rear CB	09/14/01	3,500
Winchester	Homer D. Bronson Co	GSI827	Still River	Rear CB	09/26/02	70
Winchester	Homer D Bronson Company	GSI827	Still River	Rear CB	08/01/03	1,700
Winchester	Winsted Precision Ball Company	GSI910	Still River	DSN001	06/12/02	>200
Winchester	Winsted Precision Ball Company	GSI910	Still River	DSN001	10/16/02	4

Municipal Stormwater Permitted Sources

Per the EPA Phase II Stormwater rule all municipal storm sewer systems (MS4s) operators located within US Census Bureau Urbanized Areas (UAs) must be covered under MS4 permits regulated by the appropriate State agency. There is an EPA waiver process that municipalities can apply for to not participate in the MS4 program. In Connecticut, EPA has granted such waivers to 19 municipalities. All participating municipalities within UAs in Connecticut are currently regulated under MS4 permits by CT DEEP staff in the MS4 program.

The US Census Bureau defines a UA as a densely settled area that has a census population of at least 50,000. A UA generally consists of a geographic core of block groups or blocks that exceeds the 50,000 people threshold and has a population density of at least 1,000 people per square mile. The UA will also include adjacent block groups and blocks with at least 500 people per square mile. A UA consists of all or part of one or more incorporated places and/or census designated places, and may include additional territory outside of any place. (67 FR 11663)

For the 2000 Census a new geographic entity was created to supplement the UA blocks of land. This created a block known as an Urban Cluster (UC) and is slightly different than the UA. The definition of a UC is a densely settled area that has a census population of 2,500 to 49,999. A UC generally consists of a geographic core of block groups or blocks that have a population density of at least 1,000 people per square mile, and adjacent block groups and blocks with at least 500 people per square mile. A UC consists of all or part of one or more incorporated places and/or census designated places; such a place(s) together with adjacent territory; or territory outside of any place. The major difference is the total population cap of 49,999 people for a UC compared to >50,000 people for a UA. (67 FR 11663)

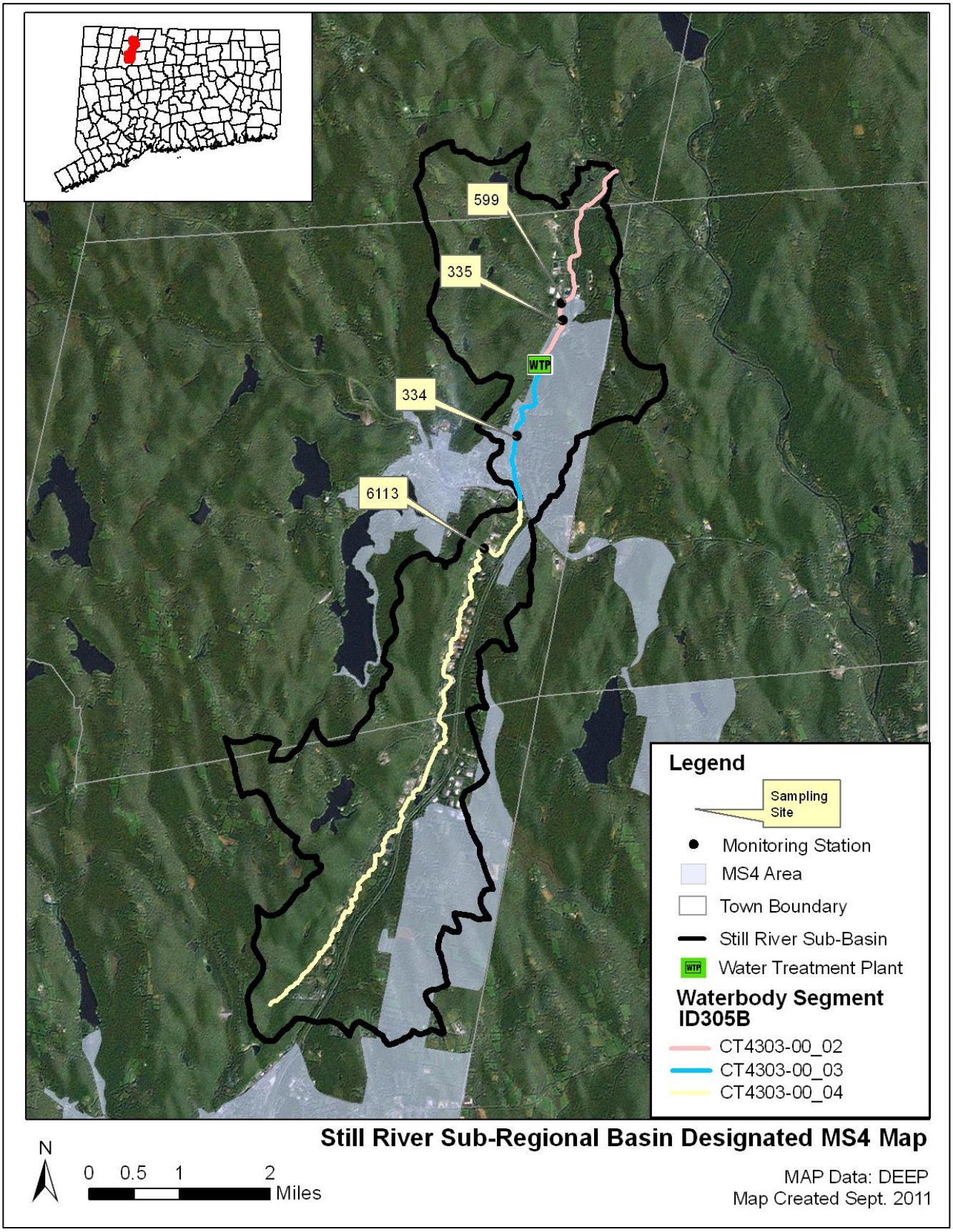
While it is possible that CT DEEP will be expanding the reach of the MS4 program to include UC municipalities in the near future they are not currently under the permit. However, the GIS layers used to create the MS4 maps in this Statewide TMDL did include both UA and UC blocks. This factor creates some municipalities that appear to be within an MS4 program that are not currently regulated through an MS4 permit. This oversight can explain a municipality that is at least partially shaded grey in the maps and there are no active MS4 reporting materials or information included in the appropriate appendix. While these areas are not technically in the MS4 permit program, they are still considered urban by the cluster definition above and are likely to contribute similar stormwater discharges to affected waterbodies covered in this TMDL.

As previously noted, EPA can grant a waiver to a municipality to preclude their inclusion in the MS4 permit program. One reason a waiver could be granted is a municipality with a total population less than 1000 people, even if the municipality was located in a UA. There are 19 municipalities in Connecticut that have received waivers, this list is: Andover, Bozrah, Canterbury, Coventry, East Hampton, Franklin, Haddam, Killingworth, Litchfield, Lyme, New Hartford, Plainfield, Preston, Salem, Sherman, Sprague, Stafford, Washington, and Woodstock. There will be no MS4 reporting documents from these towns even if they are displayed in an MS4 area in the maps of this document.

The list of US Census UCs is defined by geographic regions and is named for those regions, not necessarily by following municipal borders. In Connecticut the list of UCs includes blocks in the following Census Bureau regions: Colchester, Danielson, Lake Pocotopaug, Plainfield, Stafford, Storrs, Torrington, Willimantic, Winsted, and the border area with Westerly, RI. (67 FR 11663). Any MS4 maps showing these municipalities may show grey areas that are not currently regulated by the CT DEEP MS4 permit program.

The impaired segments of the Still River watershed are located within the Towns of Torrington, Winchester, and Colebrook. Torrington is a designated urban cluster, as defined by the U.S. Census Bureau, and is not currently required to comply with the General Permit for the Discharge of Stormwater from Small Municipal Storm Sewer Systems (MS4 permit) issued by the Connecticut Department of Energy and Environmental Protection (DEEP). This general permit is only applicable to municipalities that are identified in Appendix A of the MS4 permit that contain designated urban areas and discharge stormwater via a separate storm sewer system to surface waters of the State. Additional information regarding stormwater management and the MS4 permit can be obtained on CT DEEP's website (http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325702&depNav_GID=1654). The municipalities of Winchester and Colebrook are also not currently regulated under an MS4 permit.

Figure 7: MS4 areas of the Still River watershed



Publicly Owned Treatment Works

As shown in Figure 7, there are two publicly owned treatment works (POTWs), or wastewater treatment plants, in the Still River watershed. The Winchester/Winsted WPCF is located in the City of Winsted at the end of the Still River (Segment 3). Bacteria data from the discharge of this POTW is shown in Table 7. The plant did not exceed its permit limits on any date sampled. A small sewage treatment plant is also located in the watershed near the Still River (Segment 4) along Route 8. This plant is the former Torrington facility and is no longer an actively discharging location.

Table 7: Wastewater treatment plant Fecal Coliform (colonies/100 mL) data discharging to the Still River

Town	Permittee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	04/30/2009	1	1
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	05/31/2009	1	2
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	06/30/2009	5	12
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	07/31/2009	5	7
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	08/31/2009	20	32
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	09/30/2009	19	42
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	10/31/2009	7	8
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	04/30/2010	1	2
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	05/31/2010	2	7
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	06/30/2010	8	10
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	07/31/2010	14	21
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	08/31/2010	4	4
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	09/30/2010	5	9
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	10/31/2010	4	6
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	04/30/2011	1	2
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	05/31/2011	1	3
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	06/30/2011	3	4

Table 7: Wastewater treatment plant Fecal Coliform (colonies/100 mL) data discharging to the Still River (continued)

Town	Permittee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	07/31/2011	9	14
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	08/31/2011	11	23
Winchester, Winsted	Winchester/ Winsted WPCF	CT0101222	Still River	09/30/2011	6	9
30-Day Geometric Mean Permit Limit = 200 colonies/100 mL **7-Day Geometric Mean Permit Limit = 400 colonies/100 mL**						

Non-point Sources

Non-point source pollution (NPS) comes from many diffuse sources and is more difficult to identify and control. NPS pollution is often associated with land-use practices. Examples of NPS that can contribute bacteria to surface waters include insufficient septic systems, pet and wildlife waste, agriculture, and contact recreation (swimming or wading). Potential sources of NPS within the Still River watershed are described below.

Wildlife and Domestic Animal Waste

Wildlife and domestic animals within the Still River watershed represent a potential source of bacteria. With the construction of roads and drainage systems, these wastes may no longer be retained on the landscape, but instead may be conveyed via stormwater to the nearest surface water. These physical land alterations can exacerbate the impact of natural sources on water quality (USEPA, 2001). As the majority of the watershed is undeveloped, particularly in the upper portion of the watershed in the Paugnut State Forest, wildlife waste is a potential source of bacteria to the Still River.

The Green Woods Country Club is located within the Still River watershed near Segment 4. Geese and other waterfowl are known to congregate in open areas including recreational fields, agricultural cropfields, and golf courses. In addition to creating a nuisance, large numbers of geese can also create unsanitary conditions on the grassed areas and cause water quality problems due to bacterial contamination associated with their droppings. Large populations of geese can also lead to habitat destruction as a result of overgrazing on wetland and riparian plants.

The central portion of the watershed in Winsted and portions of the watershed along Route 8 are characterized by residential development, particularly near the impaired segments. Waste from domestic animals, such as dogs, may also be contributing to bacteria concentrations in the Still River.

Illicit Discharges and Insufficient Septic Systems

As shown in Figure 6, portions of the Still River watershed rely on onsite wastewater treatment systems, such as septic systems. Properly managed septic systems and leach fields have the ability to effectively remove bacteria from waste. If systems are not maintained, waste will not be adequately treated and may result in bacteria reaching nearby surface and ground water. In Connecticut, local health directors or health districts are responsible for keeping track of any reported insufficient or failing septic systems in a

specific municipality. The Towns of Torrington, Winchester, and Colebrook do not have specific health directors, but are part of the Torrington Area Health District (http://www.tahd.org/).

Portions of the watershed along Route 8 and in the City of Winsted are serviced by the municipal sanitary sewer system. Sewer system leaks and other illicit discharges can contribute bacteria to nearby surface waters and have been identified as a potential source of bacteria.

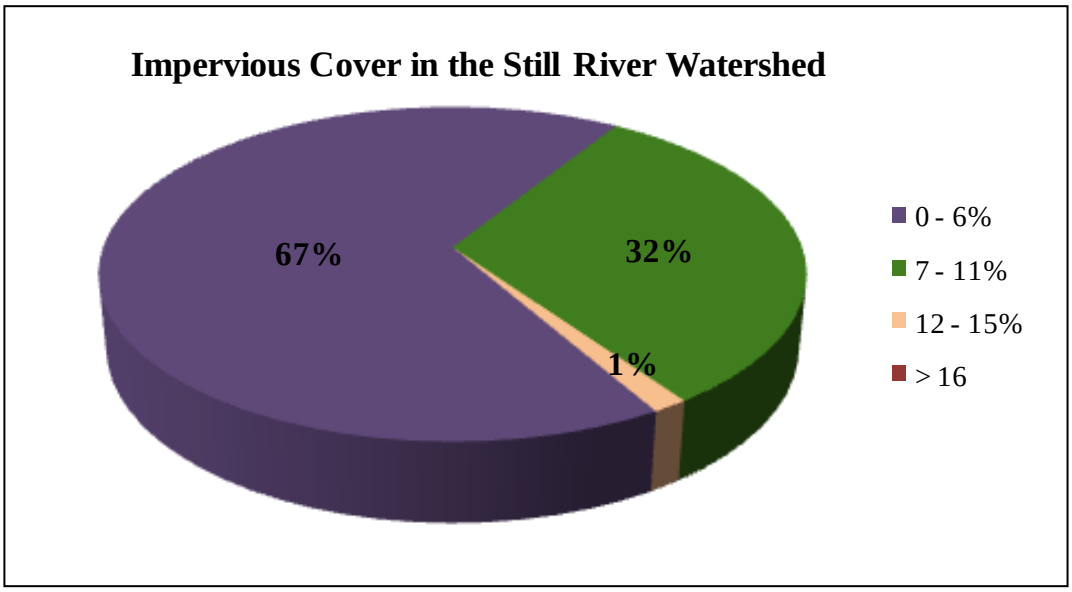
High geometric means during dry-weather may indicate the presence of insufficient septic systems, leaking sewer pipes, or other illicit discharges. As shown in Tables 10 and 12, the geometric mean for dry weather exceeded the WQS at one station on the Still River (Segment 2) (Station 335) and one station on the Still River (Segment 4) (Station 6113). Since the area near Station 335 is serviced by both the municipal sanitary sewer system and private septic systems, the Still River (Segment 2) may be receiving bacteria from system leaks or other illicit discharges. As the area near Station 6113 is not serviced by the municipal sanitary sewer system, bacteria from insufficient septic systems may be a source of impairment. As shown in Figure 6, two septage lagoons are also located just upstream of Station 6113 near the Still River (Segment 4). Leakage from these lagoons may also be contributing bacteria to this segment of the river.

Stormwater Runoff from Developed Areas

Approximately 27% of the Still River watershed is developed (Figure 3). Most development is concentrated in the central and eastern portions of the watershed in the City of Winsted and along the Route 8 corridor. Urban areas are often characterized by impervious cover, or surface areas such as roofs and roads that force water to run off land surfaces rather than infiltrate into the soil. Studies have shown a link between increasing impervious cover and degrading water quality conditions in a watershed (CWP, 2003). In one study, researchers correlated the amount of fecal coliform to the percent of impervious cover in a watershed (Mallin *et al.*, 2000).

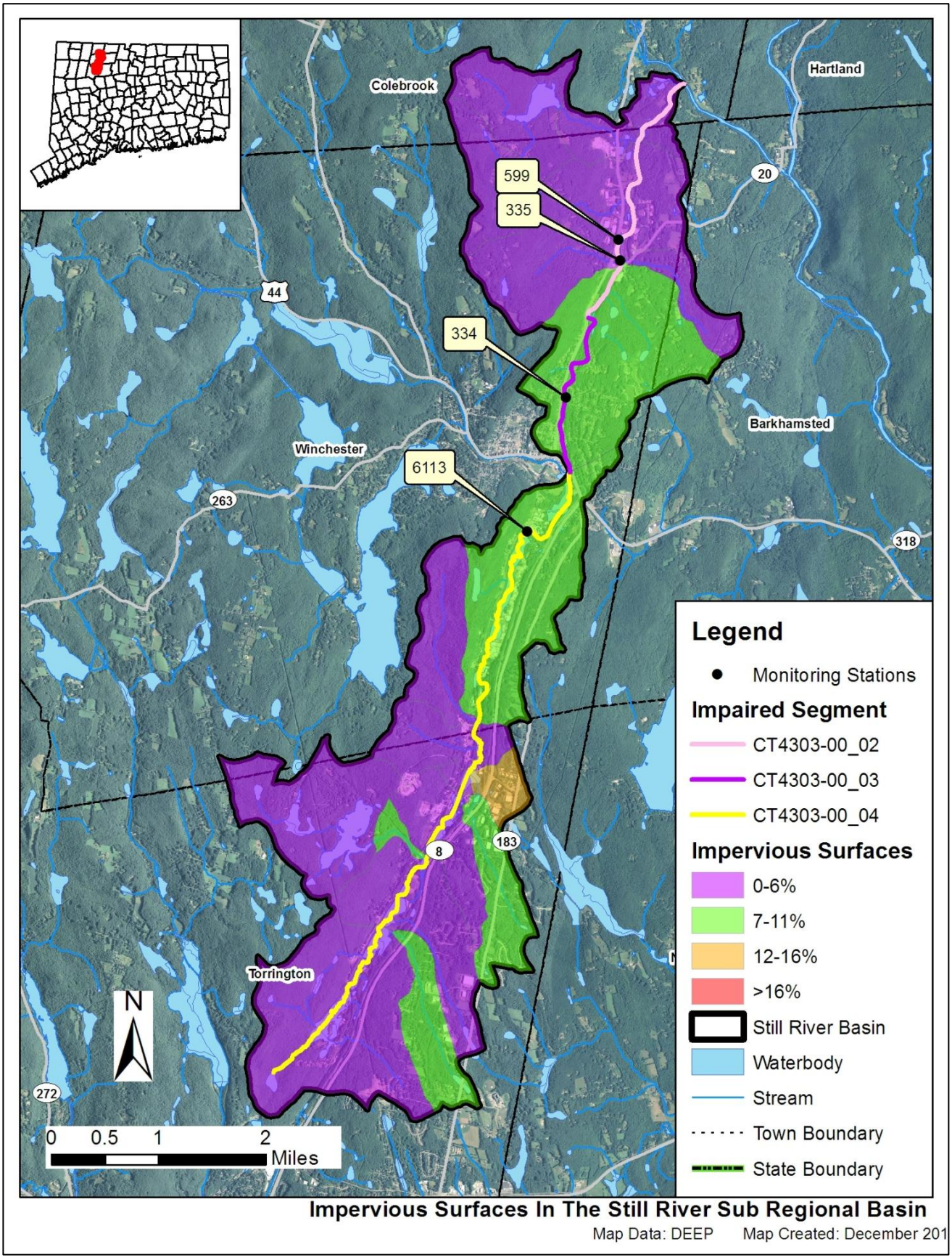
Although the majority of the Still River watershed has less than 6% impervious surfaces (Figures 8 and 9), the central portion of the watershed has a higher percentage of impervious cover (Figure 12). In particular, the areas surrounding the Still River (Segment 3) and the northern section of the Still River (Section 4) have an impervious cover of 7-11% or 12-15%, indicating that stormwater runoff may be a source of bacteria (Figure 12).

Figure 8: Range of impervious cover (%) in the Still River watershed



High geometric means during wet-weather may indicate that stormwater runoff is contributing to the bacterial impairment in a river segment. As shown in Tables 11 and 12, the geometric mean for wet weather exceeded the WQS at one station on Still River (Segment 3) (Station 334) and at one station on Still River (Segment 4) (Station 6113). As the areas surrounding these stations are the most heavily developed in the watershed (Figure 9), these segments are likely receiving bacteria from stormwater runoff. Stormwater runoff may also be contributing bacteria to the Still River (Segment 2), though no samples were taken during wet-weather.

Figure 9: Impervious cover (%) for the Still River sub-regional watershed



Agricultural Activities

Agricultural operations are an important economic activity and landscape feature in many areas of the State. Runoff from agricultural fields may contain pollutants such as bacteria and nutrients (USEPA, 2011a). This runoff can include pollutants from farm practices such as storing manure, allowing livestock to wade in nearby waterbodies, applying fertilizer, and reducing the width of vegetated buffer along the shoreline. Agricultural land use makes up 4% of the Still River watershed. Agricultural operations are scattered throughout the watershed with some located directly adjacent to the northern portion of the Still River (Segment 2) (Figure 4). In this area, agricultural runoff is likely a source of bacteria to the Still River.

Additional Sources

As shown in Figure 6, the landfill just south of Route 44 near Route 8 in Torrington may also be contributing bacteria to the Still River. There may be other sources not listed here or identified in Figure 6 that contribute to the observed water quality impairment in the Still River watershed. Further monitoring and investigation will confirm the listed sources and discover additional ones. More detailed evaluation of potential sources is expected to become available as activities are conducted to implement this TMDL.

Land Use/Landscape

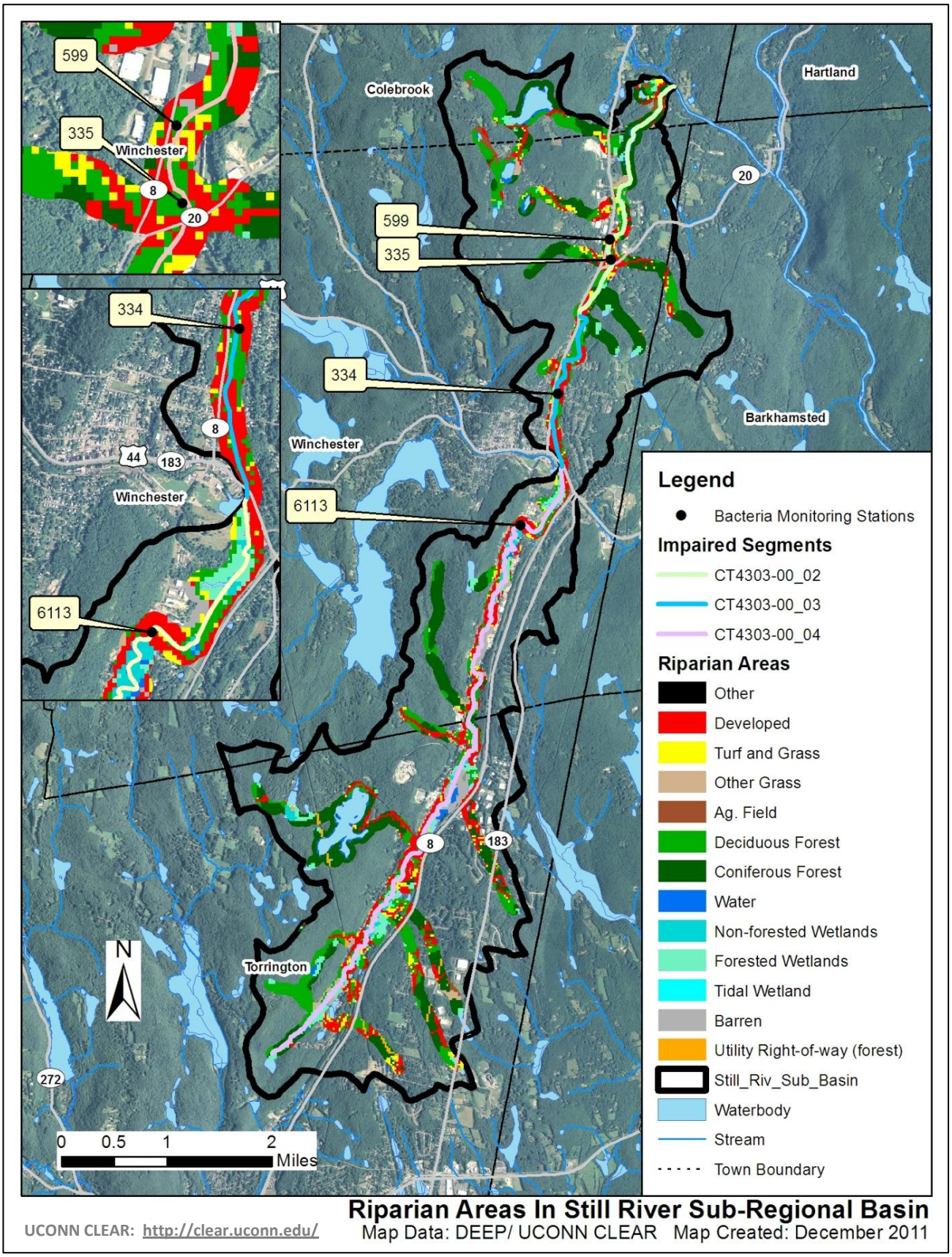
Riparian Buffer Zones

The riparian buffer zone is the area of land located immediately adjacent to streams, lakes, or other surface waters. The boundary of the riparian zone and the adjoining uplands is gradual and not always well-defined. However, riparian zones differ from uplands because of high levels of soil moisture, frequent flooding, and the unique assemblage of plant and animal communities found there. Through the interaction of their soils, hydrology, and vegetation, natural riparian areas influence water quality as contaminants are taken up into plant tissues, adsorbed onto soil particles, or modified by soil organisms. Any change to the natural riparian buffer zone can reduce the effectiveness of the natural buffer and has the potential to contribute to water quality impairment (USEPA, 2011b).

The CLEAR program at UCONN has created streamside buffer layers for the entire State of Connecticut (http://clear.uconn.edu/), which have been used in this TMDL. Analyzing this information can reveal potential sources and implementation opportunities at a localized level. The land use directly adjacent to a waterbody can have direct impacts on water quality from surface runoff sources.

The riparian zones for the impaired segments of the Still River are characterized by a mix of urban and forested areas (Figure 10). As previously noted, developed areas within the riparian zone contribute pollutants such as bacteria to the waterbody since the natural riparian buffer is not available to treat runoff.

Figure 10: Riparian buffer zone information for the Still River watershed



CURRENT MANAGEMENT ACTIVITIES

The Farmington River Watershed Association (FRWA) has worked with the Northwest Conservation District (NCD) and the Farmington River Coordinating Committee (FRCC) to address NPS issues in the Still River basin. These groups have conducted stream surveys and have completed two LID projects in cooperation with the Town of Winchester. For more information on these groups and their projects use the following websites www.frwa.org and http://www.conservect.org/Default.aspx?alias=www.conservect.org/northwest.

RECOMMENDED NEXT STEPS

Future mitigative activities are necessary to ensure the long-term protection of the Still River and have been prioritized below.

1) Continue monitoring of permitted sources.

Further monitoring will provide information essential to better locate, understand, and reduce pollution sources. If any current monitoring is not done with appropriate bacterial indicator based on the receiving water, then a recommended change during the next permit reissuance is to include the appropriate indicator species. If facility monitoring indicates elevated bacteria, then implementation of permit required, and voluntary measures to identify and reduce sources of bacterial contamination at the facility are an additional recommendation. Regular monitoring should be established for all permitted sources to ensure compliance with permit requirements and to determine if current requirements are adequate or if additional measures are necessary for water quality protection.

Section 6(k) of the MS4 General Permit requires a municipality to modify their Stormwater Management Plan to implement the TMDL within four months of TMDL approval by EPA if stormwater within the municipality contributes pollutant(s) in excess of the allocation established by the TMDL. For discharges to impaired waterbodies, the municipality must assess and modify the six minimum measures of its plan, if necessary, to meet TMDL standards. Particular focus should be placed on the following plan components: public education, illicit discharge detection and elimination, stormwater structures cleaning, and the repair, upgrade, or retrofit of storm sewer structures. The goal of these modifications is to establish a program that improves water quality consistent with TMDL requirements. Modifications to the Stormwater Management Plan in response to TMDL development should be submitted to the Stormwater Program of DEEP for review and approval.

Table 8 details the appropriate bacteria criteria for use as waste load allocations established by this TMDL for use as water quality targets by permittees as permits are renewed and updated, within the Still River watershed.

For any municipality subject to an MS4 permit and affected by a TMDL, the permit requires a modification of the SMP to include BMPs that address the included impairment. In the case of bacteria related impairments municipal BMPs could include: implementation or improvement to existing nuisance wildlife programs, septic system monitoring programs, any additional measures that can be added to the required illicit discharge detection and elimination (IDDE) programs, and increased street sweeping above basic permit requirements. Any non-MS4 municipalities can implement these same types of initiatives in effort to reduce bacteria source loading to impaired waterways.

Any facilities that discharge non-MS4 regulated stormwater should update their Pollution Prevention Plan to reflect BMPs that can reduce bacteria loading to the receiving waterway. These BMPs could include nuisance wildlife control programs and any installations that increase surface infiltration to reduce overall stormwater volumes. Facilities that are regulated under the Commercial Activities Stormwater Permit should report any updates to their SMP in their summary documentation submitted to DEEP.

Table 8. Bacteria (e.coli) TMDLS, WLAs, and LAs for Recreational Use

		Instantaneous *E. coli* (#/100mL)						Geometric Mean *E. coli* (#/100mL)	
Class	**Bacteria Source**	**WLA[6]**			**LA[6]**			**WLA[6]**	**LA[6]**
	Recreational Use	**1**	**2**	**3**	**1**	**2**	**3**	**All**	**All**
A	Non-Stormwater NPDES	0	0	0				0	
	CSOs	0	0	0				0	
	SSOs	0	0	0				0	
	Illicit sewer connection	0	0	0				0	
	Leaking sewer lines	0	0	0				0	
	Stormwater (MS4s)	235[7]	410[7]	576[7]				126[7]	
	Stormwater (non-MS4)				235[7]	410[7]	576[7]		126[7]
	Wildlife direct discharge				235[7]	410[7]	576[7]		126[7]
	Human or domestic animal direct discharge[5]				235	410	576		126

		Instantaneous *E. coli* (#/100mL)						Geometric Mean *E. coli* (#/100mL)	
Class	**Bacteria Source**	**WLA[6]**			**LA[6]**			**WLA[6]**	**LA[6]**
	Recreational Use	**1**	**2**	**3**	**1**	**2**	**3**	**All**	**All**
B[4]	Non-Stormwater NPDES	235	410	576				126	
	CSOs	235	410	576				126	
	SSOs	0	0	0				0	
	Illicit sewer connection	0	0	0				0	
	Leaking sewer lines	0	0	0				0	
	Stormwater (MS4s)	235[7]	410[7]	576[7]				126[7]	
	Stormwater (non-MS4)				235[7]	410[7]	576[7]		126[7]
	Wildlife direct discharge				235[7]	410[7]	576[7]		126[7]
	Human or domestic animal direct discharge[5]				235	410	576		126

(1) **Designated Swimming.** Procedures for monitoring and closure of bathing areas by State and Local Health Authorities are specified in: Guidelines for Monitoring Bathing Waters and Closure Protocol, adopted jointly by the Department of Environmental Protections and the Department of Public Health. May 1989. Revised April 2003 and updated December 2008.

(2) **Non-Designated Swimming.** Includes areas otherwise suitable for swimming but which have not been designated by State or Local authorities as bathing areas, waters which support tubing, water skiing, or other recreational activities where full body contact is likely.

(3) **All Other Recreational Uses.**

(4) Criteria for the protection of recreational uses in Class B waters do not apply when disinfection of sewage treatment plant effluents is not required consistent with Standard 23. (Class B surface waters located north of Interstate Highway I-95 and downstream of a sewage treatment plant providing seasonal disinfection May 1 through October 1, as authorized by the Commissioner.)

(5) Human direct discharge = swimmers

(6) Unless otherwise required by statute or regulation, compliance with this TMDL will be based on ambient concentrations and not end-of-pipe bacteria concentrations

(7) Replace numeric value with "natural levels" if only source is naturally occurring wildlife. Natural is defined as the biological, chemical and physical conditions and communities that occur within the environment which are unaffected or minimally affected by human influences (CT DEEP 2011a). Sections 2.2.2 and 6.2.7 of this Core Document deal with BMPs and delineating type of wildlife inputs.

2) Evaluate municipal programs regarding animal waste.

Any education and outreach program in the watershed should highlight the importance of not feeding waterfowl and wildlife and managing waste from horses, dogs, and other pets. The towns and residents can take measures to minimize waterfowl-related impacts such as allowing tall, coarse vegetation to grow in the riparian areas of the impaired segments that are frequented by waterfowl. Waterfowl, especially grazers like geese, prefer easy access to water. Maintaining an uncut vegetated buffer along the shore will make the habitat less desirable to geese and encourage migration. In addition, any educational program should emphasize that feeding waterfowl, such as ducks, geese, and swans, may contribute to water quality impairments in the Still River watershed and can harm human health and the environment.

Animal wastes should be disposed of away from any waterbody or storm drain system. BMPs effective at reducing the impact of animal waste on water quality include installing signage, providing pet waste receptacles in high-uses areas, enacting ordinances requiring the clean-up of pet waste, and targeting educational and outreach programs in problem areas.

3) Develop a system to monitor septic systems.

Many residents of the Still River watershed rely on septic systems. If not already in place, all municipalities within the watershed should establish a program to ensure that existing septic systems are properly operated and maintained. For instance, communities can create an inventory of existing septic systems through mandatory inspections. Inspections help encourage proper maintenance and identify failed and sub-standard systems. Policies that govern the eventual replacement of the sub-standard systems within a reasonable timeframe could also be adopted. Municipalities can also develop programs to assist citizens with the replacement and repair of older and failing systems. Particular attention should be paid to the two septage lagoons located near the Still River (Segment 4) (Figure 6).

4) Implement a program to evaluate the sanitary sewer system.

Many residents of the Still River watershed rely on a municipal sewer system (Figure 6), including those residents near Route 8 and the impaired segments of the river. It is important for Torrington and Winchester to develop a program to evaluate its sanitary sewer system and reduce leaks and overflows. This program should include periodic inspections of the sewer line.

5) Identify areas in the Still River watershed to implement Best Management Practices (BMPs) to control stormwater runoff.

As noted previously, 27% of the Still River watershed is considered urban. Though most of the watershed has an impervious cover of less than 6%, some areas near the impaired segments have a higher level of impervious cover. As such, stormwater runoff is likely contributing bacteria to the Still River.

Towns that are not MS4 communities could also choose to adopt the 6 minimum measures required under the MS4 permit. Though not required, adopting these minimum measures would provide a framework for addressing areas of the watershed that may be contributing bacteria through stormwater runoff. The MS4 General Permit is required for any municipality with urbanized areas that initiates, creates, originates or

maintains any discharge of stormwater from a storm sewer system to waters of the State. The MS4 permit requires towns to design a Stormwater Management Plan (SMP) to reduce the discharge of pollutants in stormwater to improve water quality. The plan must address the following 6 minimum measures:

1. Public Education and Outreach
2. Public Involvement/Participation
3. Illicit discharge detection and elimination
4. Construction site stormwater runoff control
5. Post-construction stormwater management in the new development and redevelopment
6. Pollution prevention/good housekeeping for municipal operations

To identify specific areas that are contributing bacteria to the impaired segments, Torrington and Winchester should conduct wet-weather sampling at stormwater outfalls that discharge directly to the impaired segment of Still River watershed. To treat stormwater runoff, the towns should identify areas along the river to install BMPs that encourage stormwater to infiltrate into the ground before entering the waterbodies. These BMPs would disconnect impervious areas and reduce pollutant loads to the river. More detailed information and BMP recommendations can be found in the core TMDL document. Particular attention should be paid to the portion of the Still River that flows through Winsted, as the geometric mean during wet-weather was high at Station 334 on Segment 3 (Table 11).

6) Ensure there are sufficient buffers on agricultural lands in the Still River watershed.

If not already in place, agricultural producers should work with the CT Department of Agriculture and the U.S. Department of Agriculture Natural Resources Conservation Service to develop conservation plans for their farming activities within the watershed. These plans should focus on ensuring that there are sufficient stream buffers, that fencing exists to restrict livestock and horse access to streams and wetlands, and that animal waste handling, disposal, and other appropriate Best Management Practices (BMPs) are in place.

BACTERIA DATA AND PERCENT REDUCTIONS TO MEET THE TMDL

Table 8: Still River (Segment 2) Bacteria Data

Waterbody ID: CT4303-00_02

Characteristics: Freshwater, Class B, Habitat for Fish and other Aquatic Life and Wildlife, Recreation, and Industrial and Agricultural Water Supply

Impairment: Recreation (*E. coli bacteria)*

Water Quality Criteria for E. coli:

Geometric Mean: 126 colonies/100 mL

Single Sample: 410 colonies/100ml

Percent Reduction to meet TMDL:

Geometric Mean: **67%**

Single Sample: **NA**

Data: 1998-2000 from CT DEEP targeted sampling efforts, 2012 TMDL Cycle

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Still River (Segment 2) with annual geometric means calculated

Station Name	Station Location	Date	Results	Wet/ Dry	Geomean
599	300 meters downstream of VFW building at Route 8 crossing	10/5/2000	41	dry	NA
335	Off Route 8 crossing behind Veterans of Foreign Wars (VFW) building	10/21/1998	410	dry	NA
335	Off Route 8 crossing behind Veterans of Foreign Wars building	3/11/1999	370	dry	**380* (67%)**
335	Off Route 8 crossing behind Veterans of Foreign Wars building	6/15/1999	370	wet	
335	Off Route 8 crossing behind Veterans of Foreign Wars building	9/15/1999	400	dry	

Shaded cells indicate an exceedance of water quality criteria

***Indicates geometric mean value used to calculate the percent reduction**

Wet and dry weather *E. coli* (colonies/100 mL) geometric mean values for Stations 559 and 335 on Still River (Segment 2)

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
599	300 meters downstream of VFW building at Route 8 crossing	2000	0	1	NA	NA	NA
335	Off Route 8 crossing behind Veterans of Foreign Wars (VFW) building	1998-1999	1	3	387	NA	393

Shaded cells indicate an exceedance of water quality criteria

Weather condition determined from rain gage at the Norfolk 2 SW in Norfolk, CT

Table 9: Still River (Segment 3) Bacteria Data

Waterbody ID: CT4303-00_03

Characteristics: Freshwater, Class B, Potential Public Drinking Water Supply, Habitat for Fish and other Aquatic Life and Wildlife, Recreation, Navigation, and Industrial and Agricultural Water Supply

Impairment: Recreation (*E. coli bacteria)*

Water Quality Criteria for E. coli:

Geometric Mean: 126 colonies/100 mL

Single Sample: 410 colonies/100 mL

Percent Reduction to meet TMDL:

Geometric Mean: **20%**

Single Sample: **58%**

Data: 1998-2000 from CT DEEP targeted sampling efforts, 2012 TMDL Cycle

Single sample *E. coli* data (colonies/100 mL) from Station 334 on the Still River (Segment 3) with annual geometric mean calculated

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
334	100 meters upstream of Wallens Street crossing	10/21/1998	10	dry	NA
334	100 meters upstream of Wallens Street crossing	3/11/1999	10	dry	**157* (20%)**
334	100 meters upstream of Wallens Street crossing	6/15/1999	**970†* (58%)**	wet	
334	100 meters upstream of Wallens Street crossing	9/15/1999	400	dry	
334	100 meters upstream of Wallens Street crossing	10/5/2000	52	dry	NA

Shaded cells indicate an exceedance of water quality criteria

†Average of two duplicate samples

***Indicates single sample and geometric mean values used to calculate the percent reduction**

Wet and dry weather *E. coli* (colonies/100 mL) geometric mean values for Station 334 on the Still River (Segment 3)

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
334	100 meters upstream of Wallens Street crossing	1998-2000	2	4	112	961	38

Shaded cells indicate an exceedance of water quality criteria

Weather condition determined from rain gage at the Norfolk 2 SW in Norfolk, CT

Table 10: Still River (Segment 4) Bacteria Data

Waterbody ID: CT4303-00_04

Characteristics: Freshwater, Class A, Potential Public Drinking Water Supply, Habitat for Fish and other Aquatic Life and Wildlife, Recreation, Navigation, and Industrial and Agricultural Water Supply

Impairment: Recreation (*E. coli bacteria)*

Water Quality Criteria for E. coli:

Geometric Mean: 126 colonies/100 mL

Single Sample: 410 colonies/100 mL

Percent Reduction to meet TMDL:

Geometric Mean: **42%**

Single Sample: **87%**

Data: 2010 from CT DEEP targeted sampling efforts, 2012 TMDL Cycle

Single sample *E. coli* data (colonies/100 mL) from Station 6113 from all monitoring stations on the Still River (Segment 4) with annual geometric mean calculated

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
6113	New Street crossing	5/17/2010	**3100* (87%)**	dry	
6113	New Street crossing	5/27/2010	2001	wet	
6113	New Street crossing	6/3/2010	110	wet	
6113	New Street crossing	6/10/2010	210	wet	
6113	New Street crossing	6/16/2010	230	dry	**217* (42%)**
6113	New Street crossing	6/23/2010	1500†	wet	
6113	New Street crossing	6/30/2010	97	dry	
6113	New Street crossing	7/14/2010	150	dry	
6113	New Street crossing	7/21/2010	110	dry	
6113	New Street crossing	8/2/2010	63	dry	
6113	New Street crossing	9/16/2010	10	dry	

Shaded cells indicate an exceedance of water quality criteria

†Average of two duplicate samples

***Indicates single sample and geometric mean values used to calculate the percent reduction**

Wet and dry weather *E. coli* (colonies/100 mL) geometric mean values for Station 6113 on the Still River (Segment 4)

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
6113	New Street crossing	2010	5	7	255	636	133
Shaded cells indicate an exceedance of water quality criteria							
Weather condition determined from rain gage at the Norfolk 2 SW in Norfolk, CT							

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